# EVALUATION OF PERFORMANCE OF LIGHT-WEIGHT PROFILOMETERS

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By

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RESEARCH

## Introduction

The ability to evaluate the smoothness of newly-constructed concrete pavements allows corrective action to be taken before further paving is done. Several lightweight non-contact profilometers (LWP) have been developed that can measure the "true" profile of new pavements quickly and efficiently. On-board computers give instant "profilograph-type" plots that show where roughness exists as well as computing a variety of roughness summary statistics, including International Roughness Index (IRI).

## Project Objective

The objective of this study was to compare as-constructed smoothness measurements by the lightweight profilometers and the KDOT California-type profilograph on newly-constructed portland cement pavements. Smoothness measurements using high-speed profilers were investigated to determine if IRI can be used for "cradle-to-grave" roughness statistics

## Project Description

Profile data was collected on selected newly-built sections of I-70 portland cement concrete pavement using four LWPs: Ames Engineering LISA, K.J. Law T6400, ICC ATV LWP, and SSI LWP. Smoothness measurements were also made with two high-speed profilometers, K.J. Law's T6600 and the ICC South Dakota profilometer. Analysis of variance (ANOVA) and least mean squares were used to analyze the data.

## Project Results

The LWPs showed statistically similar profile index (PI) values when performing as the California-type profilograph. The LWPs reported slightly higher PI values than the manual California-type profilograph using the ProScan program to reduce the traces.

The IRI values reported by LISA, T6400, and ICC ATV were statistically similar. Comparing the data from the South Dakota and T6600 high-speed profilometers with that from the SSI LWP showed significant differences in some cases. Linear regression analyses were performed to determine the correlation of the PI values from the LWPs with those from the California-type profilograph. Correlation analyses between the PI and the IRI recorded by a given profiler showed that the relationship between these smoothness statistics was site specific and equipment-dependent.

## Report Information

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